



## Water yield responses to climate change and variability across the North-South Transect of Eastern China (NSTEC)

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### Abstract:

China is facing a growing water crisis due to climate and land use change, and rise in human water demand across this rapidly developing country. Understanding the spatial and temporal ecohydrologic responses to climate change is critical to sustainable water resource management. We investigated water yield (WY) responses to historical (1981-2000) and projected potential climate changes across a large and complex climatic and land cover gradients over the North-South Transect of Eastern China (NSTEC, a standard terrestrial transect of the International GeoBiological Project, IGBP). After an annual scale evapotranspiration (ET) model was validated with historical streamflow records from ten watersheds, the model was applied to the NSTEC that encompasses seven climatic zones. We found that (1) The spatial and temporal variations of WY were highly dependent on precipitation (P) patterns during 1981-2000. Overall, the influences of significant temperature (T) rise on the trend of WY were suppressed by the insignificant P change during 1981-2000. (2) The long-term mean WY by climatic zone had a similar pattern as P. The different climatic zones had differential contributions to the total volumetric WY of the NSTEC. Within each climatic zone, the volumetric WY for each land cover type was highly dependent on its area of each land cover. (3) Corresponding to the P pattern, the mean WY decreased from the low (South) to high latitude (North), but the rates of changes varied along the NSTEC. Along the NSTEC, the sensitivity of WY to potential T and P changes increased from the high latitude to the low latitude. Future potential changes in WY are likely to follow changes in P with some modification by changes in energy availability. We conclude that precipitation is a major driver for water resource availability, and reliable prediction of future precipitation change patterns is critical to hydrologic forecast across the study region.

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### Resource Description

#### Exposure : ☒

weather or climate related pathway by which climate change affects health

Food/Water Security, Precipitation, Temperature

**Temperature:** Fluctuations

#### Geographic Feature: ☒

resource focuses on specific type of geography

# Climate Change and Human Health Literature Portal

None or Unspecified

## **Geographic Location:**

resource focuses on specific location

Non-United States

**Non-United States:** Asia

**Asian Region/Country:** China

## **Health Impact:**

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

## **Mitigation/Adaptation:**

mitigation or adaptation strategy is a focus of resource

Adaptation

## **Resource Type:**

format or standard characteristic of resource

Research Article

## **Timescale:**

time period studied

Time Scale Unspecified

## **Vulnerability/Impact Assessment:**

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content